

WHAT IS CLAIMED IS:

1. An ink-accepting layer forming material to be applied in advance to an ink-accepting surface of an object that is to be colored with ink containing an anionic coloring material, said ink-accepting
5 layer forming material comprising:

a weak acidic acrylic aqueous emulsion adhesive obtained by copolymerizing one or more ester (meth)acrylates having an alkyl group with 4-12 carbon atoms and a vinyl monomer;

10 a water-soluble cationic polymer; and
an aqueous medium, wherein

said acrylic aqueous emulsion adhesive has a viscosity of 4,000-20,000 mPa·s/30°C when it is in an emulsion state with about 50% solid content, and a dried film of said acrylic aqueous emulsion adhesive has a glass transition temperature within the range from -10 to -50°C,

15 2. An ink-accepting layer forming material according to claim 1, wherein said acrylic aqueous emulsion adhesive is obtained by copolymerizing one or more ester (meth)acrylates having an alkyl group with 4-12 carbon atoms and a vinyl monomer under presence of a nonionic surfactant.

20 3. An ink-accepting layer forming material according to claim 1, wherein said acrylic aqueous emulsion adhesive is obtained by copolymerizing one or more ester (meth)acrylates having an alkyl group with 4-12 carbon atoms under presence of a nonionic surfactant and an anionic surfactant.

25 4. An ink-accepting layer forming material according to claim 1, 2, or 3, wherein a solid content of said acrylic aqueous emulsion adhesive is 0.5 to 5% by weight, a content of said water-soluble cationic polymer is 0.1 to 3% by weight, and the rest is an aqueous medium.

30 5. An ink-accepting layer forming material according to claim 1, 2, or 3, wherein said acrylic aqueous emulsion adhesive has an average molecular weight within the range from 3,000 to 20,000 and a weight-average molecular weight within the range from 10,000 to 100,000.

6. An ink-accepting layer forming material according to claim

1, 2, or 3, wherein said acrylic aqueous emulsion adhesive has a mean particle diameter within a range from 0.1 to 3 μm .

7. An ink-accepting layer forming material according to claim 1, 2, or 3, wherein a minimum forming temperature of a dried film of 5 said acrylic aqueous emulsion adhesive is not more than 0°C.

8. An ink-accepting layer forming material according to claim 1, 2, or 3, wherein said acrylic aqueous emulsion adhesive is obtained by emulsion copolymerization of 2-ethylhexyl acrylate, butyl acrylate, and vinyl acetate.

10 9. An ink-accepting layer forming material according to claim 8, wherein a content of said vinyl acetate in said acrylic aqueous emulsion adhesive is in the range from 20 to 30% by weight on the basis of a whole copolymer.

15 10. An ink-accepting layer forming material according to claim 1, wherein said water-soluble cationic polymer is a polymer of quaternary ammonium salts.

11. An ink-accepting layer forming material according to claim 1, wherein said water-soluble cationic polymer comprises a monoarylamine derivative represented by a general formula $\text{CH}_2 = \text{CH}-\text{CH}_2-\text{NHR}$ (wherein 20 R represents an alkyl group with 1-18 carbon atoms, a substituted alkyl group, an aralkyl group, or a cycloalkyl group) or a polymer of salts thereof, or a copolymer of said monoarylamine derivative or a polymer of salts thereof and a monomer having an unsaturated double bond, which is copolymerizable with said derivative or said polymer.

25 12. An ink-accepting layer forming material according to claim 1 or 11, wherein said water-soluble cationic polymer is a polyarylamine hydrochloride having a weight-average molecular weight within a range from 1,000 to 5,000.

30 13. An ink-accepting layer forming material according to claim 1, 2, or 3, further comprising an aqueous emulsion of a weak acidic modified silicon resin having a nonionic or weak anionic particle charge.

14. An ink-accepting layer forming material according to claim 1, 2, 3, or 13, further comprising an aqueous emulsion of a weak acidic

fluorine resin having a nonionic or weak anionic particle charge.

15. An ink-accepting layer forming material according to claim 1, 2, 3, 13, or 14, further comprising an aqueous emulsion of a weak acidic polylactic acid having a nonionic or weak anionic particle charge.

16. An ink-accepting layer forming material according to claim 1, 2, or 3, wherein said anionic coloring material has an anionic group.

17. An ink-accepting layer forming material according to claim 16, wherein said anionic coloring material is one selected from a group 10 consisting of a pigment, a functional colorant, a direct dye, an acid dye, and reactive dye.

18. An object that is to be colored obtained by applying an ink-accepting layer forming material according to any one of claims 1 to 15 on an ink-accepting surface of a base material to be colored 15 with ink containing an anionic coloring material and drying a film of said ink-accepting layer forming material.

19. A method of forming an ink-accepting layer forming material, wherein an ink-accepting layer forming material according to any one of claims 1 to 15 is applied to an ink-accepting surface of a base material 20 to be colored with ink containing an anionic coloring material; and a step of applying said ink-accepting layer forming material to said ink-accepting surface of said base material to be colored to form a dried film of said ink-accepting layer forming material is repeated for a plurality of times.

25 20. An object that is to be colored according to claim 18 or 19, wherein said base material to be colored is selected from a group consisting of a natural or synthetic resin; a natural, synthetic, or mixed fiber; cloth formed of a natural, synthetic, or mixed fiber; paper; wood; leather; synthetic leather; glass; a shell; a stone; and a metal, 30 which can be used alone or as a composite material of two or more.

21. A coloring method, wherein ink containing an anionic coloring material is applied to an object that is to be colored according to claim 18, 19, or 20 by one method selected from a group consisting of

dip dyeing, printing, ink-jet printing, laser printer printing, coating, and spraying.

22 A water-base ink comprising:

a weak acidic acrylic aqueous emulsion adhesive obtained by
5 copolymerizing one or more ester (meth)acrylates having an alkyl group with 4-12 carbon atoms and a vinyl monomer;

a water-soluble cationic polymer;

an anionic coloring material; and

an aqueous medium, wherein

10 said acrylic aqueous emulsion adhesive has a viscosity of 4,000-20,000 mPa·s/30°C when it is an emulsion state with about 50% solid content, and a dried film of said acrylic aqueous emulsion adhesive has a glass transition temperature within the range from -10 to -50°C.

23. Water-base ink according to claim 22, wherein said
15 acrylic aqueous emulsion adhesive is obtained by copolymerizing one or more ester (meth)acrylates having an alkyl group with 4-12 carbon atoms under presence of a nonionic surfactant.

24. Water-base ink according to claim 22, wherein said
acrylic aqueous emulsion adhesive is obtained by copolymerizing one
20 or more ester (meth)acrylates having an alkyl group with 4-12 carbon atoms under presence of a nonionic surfactant and an anionic surfactant.

25. Water-base ink according to claim 22, 23, or 24, wherein
a solid content of said acrylic aqueous emulsion adhesive is 0.2 to
3% by weight, a content of said water-soluble cationic polymer is 0.1
25 to 3% by weight, a content of said anionic coloring material is 1 to
5% by weight, and the rest is an aqueous medium.

26. Water-base ink according to claim 22, 23, or 24, wherein
said acrylic aqueous emulsion adhesive has an average molecular weight
within a range from 3,000 to 20,000 and a weight-average molecular weight
30 thereof within a range from 10,000 to 100,000.

27. Water-base ink according to claim 22, 23, or 24, wherein
said acrylic aqueous emulsion adhesive has a mean particle diameter
within a range from 0.1 to 3 µm.

28. Water-base ink according to claim 22, 23, or 24, wherein a minimum forming temperature of a dried film of said acrylic aqueous emulsion adhesive is not more than 0°C.

29. Water-base ink according to claim 22, 23, or 24, wherein
5 said acrylic aqueous emulsion adhesive is obtained by emulsion copolymerization of 2-ethylhexyl acrylate, butyl acrylate, and vinyl acetate.

30. Water base ink according to claim 29, wherein a content of a vinyl acetate in said acrylic aqueous emulsion adhesive on the
10 basis of a whole copolymer is 20 to 30% by weight.

31. Water-base ink according to claim 22, wherein said water-soluble cationic polymer is a polymer of quaternary ammonium salts.

32. Water-base ink according to claim 22, wherein said water-soluble cationic polymer comprises a monoarylamine derivative
15 represented by a general formula $\text{CH}_2 = \text{CH}-\text{CH}_2-\text{NHR}$ (wherein R represents an alkyl group with 1-18 carbon atoms, a substituted alkyl group, an aralkyl group, or a cycloalkyl group) or a polymer of salts thereof, or a copolymer of said monoarylamine derivative or a polymer of salts thereof and a monomer having an unsaturated double bond, which is
20 copolymerizable with said derivative or said polymer.

33. Water-base ink according to claim 22 or 32, wherein said water-soluble cationic polymer is a polyarylamine hydrochloride having a weight-average molecular weight within a range from 1,000 to 5,000.

34. Water-base ink according to claim 22, 23, or 24, further
25 comprising an aqueous emulsion of a weak acidic modified silicone resin having a nonionic or weak anionic particle charge.

35. Water-base ink according to claim 22, 23, 34, or 34, further comprising an aqueous emulsion of a weak acidic fluorine resin having a nonionic or weak anionic particle charge.

30 36. Water-base ink according to claim 22, 23, 24, 34, or 35, further comprising an aqueous emulsion of weak acidic polylactic acid having a nonionic or weak anionic particle charge.

37. Water-base ink according to claim 22, 23, or 24, wherein

said anionic coloring material has an anionic group.

38. Water-base ink according to claim 37, wherein said anionic coloring material is at least one selected from a group consisting of a pigment, a functional colorant, a direct dye, an acid dye, and
5 a reactive dye.

39. An object that is to be colored by applying water-base ink according to any one of claims 22 to 28 to an ink-accepting surface of a base material to be colored.

40. An object to be colored according to claim 39, wherein said
10 base material is selected from a group consisting of cloth formed of a natural fiber, cloth formed of a synthetic fiber, cloth formed of a mixed fiber, paper, wood, leather, synthetic leather, glass, a stone, a metal, and plastic.

41. A coloring method, wherein water-base ink according to any
15 one of claims 22 to 38 is applied to an ink-accepting surface of a base material to be colored by one method selected from a group consisting of dip dyeing, printing, ink-jet printing, laser printer printing, coating, and spraying.

42. A coloring method according to claim 41, wherein said base
20 material to be colored is selected from a group consisting of a natural or synthetic resin; a natural, synthetic, or mixed fiber; cloth formed of a natural, synthetic, or mixed fiber; paper; wood; leather; synthetic leather; glass; a shell; a stone; and a metal, which can be used alone or as a composite material of two or more.